

**WHAT IS CLAIMED IS:**

1           1. A method of operating a multi-plane cell switching node, the cell switching  
2 node having a first switch plane; a second switch plane; and plural switch port interface  
3 units; the method comprising:

4           in response to detection of a fault in the first switch plane, the second switch  
5 plane:

6                     sending a plane change cell to the plural switch port interface units;

7                     stopping egress traffic flow from the second switch plane;

8           in response to receipt of the plane change cell, redirecting traffic cells sent by the  
9 plural switch port interface units from the first switch plane to the second switch plane;

10           determining when traffic cells destined to a particular switch port interface unit  
11 have been flushed from the first switch plane; and thereafter

12           starting the egress traffic flow from the second switch plane to the particular  
13 switch port interface unit.

1           2. The method of claim 1, further comprising a fault-detecting switch port  
2 interface unit sending a fault detection cell to the second switch plane upon detection of  
3 a fault in the first switch plane.

1           3. The method of claim 2, wherein in response to the receipt of the fault  
2 detection cell, the second switch plane sends a broadcast plane change signal to plural  
3 cell receiving units of the second switch plane, the plural cell receiving units  
4 corresponding to the plural switch port interface units, and wherein the plural cell  
5 receiving units generate the plane change cells for sending to the respective plural  
6 switch port interface units.

1           4. The method of claim 1, further comprising:  
2           the step of sending a plane change cell to the plural switch port interface units  
3 occurring in response to the second switch plane sending a broadcast plane change  
4 signal to plural cell receiving units of the second switch plane, the plural cell receiving  
5 units corresponding to the plural switch port interface units, and  
6           generating at the plural cell receiving units the plane change cells for sending to  
7 the respective plural switch port interface units.

8  
1 5. The method of claim 1, wherein the step of determining when traffic cells  
2 have been flushed from the first switch plane comprises:

3 sending first predetermined non-traffic cells from the plural switch port interface  
4 units to the first switch plane;

5 in accordance with receipt of the first predetermined non-traffic cells via the first  
6 switch plane at a particular switch port interface unit, sending a second predetermined  
7 non-traffic cell from the particular switch port interface unit to the second switch plane;  
8 and

9 wherein the step of starting the egress traffic flow from the second switch plane  
10 to the particular switch port interface unit is performed upon reception of the second  
11 predetermined non-traffic cell from the particular switch port interface unit at the  
12 second switch plane.

1 6. The method of claim 5, wherein the first predetermined non-traffic cells are  
2 synchronization cells.

1 7. The method of claim 5, wherein the second predetermined non-traffic cell is a  
2 management cell.

1 8. The method of claim 1, further comprising stopping ingress of cells to the  
2 first switch plane and the second switch plane until expiration of a predetermined time.

1 9. The method of claim 8, further comprising setting the predetermined time  
2 sufficiently long to ensure that the slowest switch port interface unit has had time to  
3 receive the plane change cell and to redirect traffic cells to the second switch plane.

1 10. The method of claim 1, wherein prior to the fault detection the first switch  
2 plane serves as an active switch plane and the second switch plane serves as a passive  
3 switch plane.

1 11. A method of operating a multi-plane cell switching node, the cell switching  
2 node having a first switch plane; a second switch plane; and plural switch port interface  
3 units; the method comprising:

4 a fault-detecting switch port interface unit sending a fault detection cell to the  
5 second switch plane upon detection of a fault in the first switch plane;

6 in response to receipt of the fault detection cell, the second switch plane:

7 sending a plane change cell to the plural switch port interface units;

8 stopping egress traffic flow in the second switch plane;

9 in response to receipt of the plane change cell, redirecting traffic cells sent from  
10 the plural switch port interface units from the first switch plane to the second switch  
11 plane;

12 sending first predetermined non-traffic cells from the plural switch port interface  
13 units to the first switch plane;

14 in accordance with receipt of the first predetermined non-traffic cells via the first  
15 switch plane at a particular switch port interface unit, sending a second predetermined  
16 non-traffic cell from the particular switch port interface unit to the second switch plane;

17 using the second predetermined non-traffic cell to start egress flow of cells from  
18 the second switch plane to the particular switch port interface unit.

1 12. The method of claim 11, further comprising stopping ingress of cells to the  
2 first switch plane and the second switch plane until expiration of a predetermined time.

1 13. The method of claim 12, further comprising setting the predetermined time  
2 sufficiently long to ensure that the slowest switch port interface unit has had time to  
3 receive the plane change cell and to redirect traffic cells to the second switch plane.

1 14. The method of claim 11, wherein in response to the receipt of the fault  
2 detection cell, the second switch plane sends a broadcast plane change signal to plural  
3 cell receiving units of the second switch plane, the plural cell receiving units  
4 corresponding to the plural switch port interface units, and wherein the plural cell  
5 receiving units generate the plane change cells for sending to the respective plural  
6 switch port interface units.

1 15. The method of claim 11, wherein prior to the fault detection the first switch  
2 plane serves as an active switch plane and the second switch plane serves as a passive  
3 switch plane.

1        16. A multi-plane cell switching node comprising:  
2        a first switch plane;  
3        plural switch port interface units;  
4        a second switch plane which, in response to detection of a fault in the first switch  
5 plane, stops egress traffic flow from the second switch plane and sends a plane change  
6 cell to the plural switch port interface units;  
7        wherein, in response to receipt of the plane change cell, the switch port interface  
8 units redirect traffic cells to the second switch plane and, upon determining when traffic  
9 cells have been flushed from the first switch plane; send an egress traffic flow-starting  
10 cell to the second switch plane.

1        17. The apparatus of claim 16, further comprising a fault-detecting switch port  
2 interface unit which sends a fault detection cell to the second switch plane upon  
3 detection of a fault in the first switch plane.

1        18. The apparatus of claim 17, further comprising plural cell receiving units of  
2 the second switch plane, the plural cell receiving units corresponding to the plural  
3 switch port interface units, and wherein in response to the receipt of the fault detection  
4 cell, the second switch plane sends a broadcast plane change signal to the plural cell  
5 receiving units, and in response the plural cell receiving units generate the plane change  
6 cells for sending to the respective plural switch port interface units.

1        19. The apparatus of claim 16, further comprising plural cell receiving units of  
2 the second switch plane, the plural cell receiving units corresponding to the plural  
3 switch port interface units, and wherein the second switch plane sends the plane change  
4 cell to the plural switch port interface units in response to the second switch plane  
5 sending a broadcast plane change signal to the plural cell receiving units of the second  
6 switch plane, and wherein the plural cell receiving units generate the plane change cells  
7 for sending to the respective plural switch port interface units.  
8

1        20. The apparatus of claim 16, wherein the plural switch port interface units  
2 send first predetermined non-traffic cells through the first switch plane and detect  
3 reception of the first predetermined non-traffic cells from the first switch plane,  
4 whereupon the switch port interface units send a second predetermined non-traffic cell

5 to the second switch plane; and wherein the second switch plane starts the egress traffic  
6 flow from the second switch plane to the respective switch port interface units upon  
7 reception of the second predetermined non-traffic cell at the second switch plane.

1 21. The apparatus of claim 20, wherein the first predetermined non-traffic cells  
2 are synchronization cells.

1 22. The apparatus of claim 20, wherein the second predetermined non-traffic  
2 cell is a management cell.

1 23. The apparatus of claim 16, wherein the second switch plane stops ingress of  
2 cells to the first switch plane and the second switch plane until expiration of a  
3 predetermined time.

1 24. The apparatus of claim 23, wherein the predetermined time is set sufficiently  
2 long to ensure that the slowest switch port interface unit has had time to receive the  
3 plane change cell and to redirect traffic to the second switch plane.

1 25. The apparatus of claim 16, wherein prior to the fault detection the first  
2 switch plane serves as an active switch plane and the second switch plane serves as a  
3 passive switch plane.

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